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CONTRIBUTIONS FROM WALKER MUSEUM
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(1) Atactocrinus, a New Crinoid Genus from the Richmond of Illinois

(2) Description of a Ste. Genevieve Limestone Fauna from Monroe County, Illinois

BY
STUART WELLER

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ATACTOCRINUS, A NEW CRINOID GENUS FROM THE RICHMOND OF ILLINOIS

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Among the fossils collected in the Richmond beds along the Kankakee River near Wilmington, Illinois, a peculiar form of subglobular or bead-like crinoid stem segment is not uncommon. Crinoid calyces, however, are exceedingly rare in the collections, and a single specimen only has come under the observation of the writer. It is not possible to establish, with certainty, the association of the bead-like joints and this single crinoid body as portions of the same specific form, but it does seem altogether probable that they belong together. The single example of a calyx which has been found is that of a Camerate crinoid, with several peculiarities that differentiate it from any of the already defined genera, and it is here described as a new generic form.

Atactocrinus n.gen.

Generic diagnosis.—Dicyclic, the basals, radials, and first interbrachials subequal in size, the posterior and anterior-lateral basals truncated distally for the support of the first interbrachials, the radials being separated in these interradial areas. The postero-lateral basals pointed distally and the adjacent radials in contact laterally above the basals.

Atactocrinus wilmingtonensis n.sp. (Pl. XV, Figs. 1–10)

Description.—Dorsal cup bowl-shaped, rounded below, the sides gently diverging distally. Base dicyclic, the underbasals five in number, uniform in size, and together forming a nearly horizontal, pentagonal disk with the sides very slightly emarginate, which projects a little beyond the stem facet; the diameter of the underbasal disk in the type specimen 7.5 mm. Each basal about as large as the entire underbasal disk, the two postero-lateral ones hexagonal in outline, pointed distally, the other three heptagonal and truncated distally. The radials about equaling the basals in size, four of them hexagonal, the fifth, the anterior one, pentagonal. The first brachials a little smaller than the radials, hexagonal in outline. The higher brachials not preserved. First interbrachials nearly as large as the basals and radials, the two postero-lateral ones hexagonal in outline, the other three heptagonal; resting upon the first interbrachials in each interbrachial area in which the higher plates are preserved there are two plates, each one being about one-half the size of the first interbrachials. Higher plates of the dorsal cup, the arms, and the tegmen not known.

Surfaces of the plates, above the underbasals, flattened centrally or with a shallow, ill-defined depression in the basals, radials, and first interbrachials; toward their lateral margins the surfaces are convexly curved to the sutures, which occupy grooves of moderate depth, the depth increasing at the angles where three plates meet. The fine surface markings of the plates consist of delicate striations which are divided into rhombic areas, each rhomb being bisected by a suture between two plates. In each of these rhombic areas the markings are parallel and cross the bisecting suture at right angles; about seven or eight of these striae occupy the space of 2 mm.

Remarks.—The only vertical plane that can be passed through this crinoid to divide it symmetrically, passes through the interradial resting upon the truncated basal which lies between the two basals that are pointed distally. This being true, it is assumed that this basal is the posterior one, the two distally pointed plates being the postero-lateral and the two contiguous truncated ones being the antero-lateral basals. The arrangement of the plates exhibited in this species does not conform with the definitions of any family of Camerate crinoids with which it can be compared. With its dicyclic base the families Dimerocrinidae and Rhodocrinidae are at once suggested. If the two postero-lateral basals were truncated it could be assigned at once to the Rhodocrinidae, while if the two antero-laterals were pointed it could be just as satisfactorily placed in the Dimerocrinidae. As it stands, the genus is intermediate in character between these two families and may constitute a connecting bond between them. With a single example, such as is available for examination, it is of course possible that the characters exhibited are not entirely normal, but the specimen is so symmetrically developed that there seems to be little likelihood of its being abnormal.

EXPLANATION OF PLATE XV

Atactocrinus wilmingtonensis n.sp.

FIG. 1.—Posterior view of dorsal cup, showing the truncated posterior basal.

FIG. 2.—Anterior view of dorsal cup, showing the truncated right- and left-anterior basals.

FIG. 3.—Right-posterior view of dorsal cup, showing the distally pointed right-posterior basal.

FIG. 4.—Left-posterior view of dorsal cup, showing the distally pointed left-posterior basal.

FIG. 5.—Basal view of dorsal cup.

FIG. 6.—Posterior side of dorsal cup enlarged, showing the ornamentation of the plates (×4).

FIG. 7.—Diagram of the plate arrangement.

FIGS. 8–10.—Views of three bead-like stem segments probably belonging to this species.

DESCRIPTION OF A STE. GENEVIEVE LIMESTONE FAUNA FROM MONROE COUNTY, ILLINOIS[1]

Nowhere in the literature on the paleontology of the Mississippian formations has the fauna of the Ste. Genevieve limestone been sufficiently differentiated from that of the St. Louis limestone, the next older formation in the standard section. A considerable number of Ste. Genevieve species have been described, but in almost every instance they have been described as members of the St. Louis limestone fauna. Researches upon the Mississippian formations during the past decade have established the fact that, as a formation, the Ste. Genevieve limestone is separated from the underlying St. Louis limestone by a distinct unconformity,[2] and that the overlying basal Chester is again unconformable upon the Ste. Genevieve. Furthermore, the fauna of the Ste. Genevieve limestone is now known to possess certain characters which serve to differentiate it also from the faunas of the preceding and succeeding formations.

Ulrich[3] has published a list of 75 species as occurring in the Ste. Genevieve limestone in Kentucky, but this list does not properly express the fauna as it is known at Ste. Genevieve, Missouri, and in Monroe and Randolph counties, Illinois, in the typical area of the formation, and it is altogether probable that the Ste. Genevieve limestone in Kentucky, as interpreted by Ulrich, includes beds which should really be referred to the Renault formation of the Chester group.

It is not the purpose of the present paper to describe the Ste. Genevieve limestone fauna in its entirety, for it is known to include many other species. The collections from a single stratum only, at one locality, are here described, this faunule being selected because of the large number of species present and because it represents one of the most typical facies of the fauna as a whole.

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[1] Published by permission of the Director of the Illinois State Geological Survey.

[2] Ulrich, *U.S. Geol. Surv., Prof. Paper, No. 36* (1905), p. 39; Weller, *Ill. State Geol. Surv., Monog. 1* (1914), p. 21.

[3] *Op. cit.*, pp. 47–48.

The collection is from a locality on Fountain Creek, two miles southwest of Waterloo, Monroe County, Illinois. The geological section in the bluffs at this locality, where the strata are well exposed in a rock gorge a mile or more in length, is as follows:

		Feet
9.	Oölitic limestone	5
8.	White, arenaceous, oölitic limestone, with a prolific fauna in certain bands	17
7.	Red, purple, or green shaly bed, discontinuous, highly fossiliferous locally	1
6.	Semi-oölitic limestone, more or less cross-bedded	4
5.	Green, calcareous, shale band, not continuous	1
4.	Thick- or thin-bedded, dense, white limestone	7
3.	Oölitic limestone	3
2.	Granular limestone, strongly cross-bedded below, becoming more regularly bedded above	12
1.	Evenly bedded limestone in layers, fine-textured and compact, with some chert	10

Bed No. 1 of the foregoing section is exposed just above the stone bridge over Fountain Creek, on the highway from Waterloo to Valmeyer, and may be considered as the topmost member of the St. Louis limestone. All of the succeeding beds are Ste. Genevieve in age, and well exhibit the characteristics of this formation as it is developed in Monroe County, viz., the conspicuously cross-bedded limestones, in places with more or less arenaceous material mingled with the calcium carbonate, the oölitic limestone strata, and the red, purple, or green colors at intervals.

The fauna here considered occurs in the arenaceous, oölitic limestone bed, No. 8. Fossils occur in great abundance in certain bands and pockets in this stratum, and the locality has furnished the types of a number of species described by Meek and Worthen and by Worthen. Meek and Worthen[1] have described the following species from "Waterloo, Monroe County, Illinois; upper part of St. Louis group," all of which are from the bed here under discussion: *Yoldia ? levistriata*, *Nuculana ? curta*, *Dentalium venustum*, *Straparollus similis*, *Straparollus similis* var. *planus*. At a later date Worthen[2] described several other species from the

[1] *Geological Survey of Illinois*, II.

[2] *Ibid.*, VIII.

same locality said to be from "oölitic beds of the St. Louis limestone, on Fountain Creek, Monroe County, Illinois," as follows: *Schizodus depressus*, *Schizodus? circulus*, *Aviculopecten monroensis*, *Aviculopecten talboti*, *Pleurophorus minimus*, *Pleurophorus monroensis*, *Modiola illinoiensis*, *Myalina monroensis*, *Nucula illinoiensis*, and *Solenomya monroensis*. The original specimens of all the species described by these authors are now preserved in the collections of the Illinois State Museum, at Springfield, and they have been made available for study by the writer through the courtesy of Dr. A. R. Crook, the curator of the museum.

Besides these forms which have already been described, the fauna contains many others, some of which can be identified with described forms, while others, especially a considerable number of small gastropods, have not previously been described. The members of the fauna will be considered systematically.

DESCRIPTION OF SPECIES

Cystelasma sp. (Pl. XIX, Figs. 21, 22 [×4])

Several small horn corals with a very irregular habit of growth have been observed in the fauna, which resemble in their general characters those corals which have been referred to the genus *Cystelasma*. These Ste. Genevieve examples have not been referred to any of the described species of the genus because their internal characters are wholly unknown, and furthermore they seem to be smaller than any of the recognized species.

Orthotetes kaskaskiensis (McChesney)? (Pl. XVI, Fig. 1)

A species of *Orthotetes* is represented in the collection by numerous more or less fragmentary specimens, the largest example observed being an imperfect pedicle valve about 40 mm. in width. Most of the specimens are smaller, ranging from 15 to 25 mm. in width, or even less. In general form the specimens resemble a common shell in the Salem and St. Louis limestone faunas which may be identified with Hall and Clarke's *Derbyia ruginosa*,[1] although that species is not a septate shell and should be referred to the genus *Streptorhynchus*. The Ste. Genevieve species is septate, at least in the only specimen so preserved as to admit of its demonstration, a low but distinct medium septum is present in the pedicle valve, so that it cannot be identified, even generically, with the Salem limestone species. The only species of septate shell of this type with which the Ste. Genevieve form can be compared is *Orthotetes kaskaskiensis*, and it is so identified with a query.

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[1] The absence of a medium septum in the pedicle valve of this species is clearly exhibited in the holotype.

Streptorhynchus; cf. *S. minutum* (Cumings) (Pl. XVI, Fig. 2 [×4])

Only two examples of this little shell, both brachial valves, have been observed, the most perfect of which has a width of 4.5 mm. The specimens resemble *S. minutum* of the Salem limestone in their small size, but the convexity of both specimens is much greater than that of any example of a brachial valve of *S. minutum* which has come under observation; also the plications are very much stronger and coarser, and the hinge-line is proportionally shorter, with more rounded cardinal extremities.

Pugnoides ottumwa (White) (Pl. XVI, Figs. 7, 8 [×2])

This species, originally described from the Pella beds of Iowa, is perhaps the best index fossil of the Ste. Genevieve in Monroe County, Illinois, and also in Ste. Genevieve County, Missouri. A comparison of many complete examples with a large number of well-preserved specimens from Iowa has shown that the shells from the two regions cannot be separated specifically. Much variation is exhibited, but many Iowa specimens can be selected which are practically identical in form and proportions with Illinois examples.

Composita trinuclea (Hall) (Pl. XVI, Figs. 3–6 [×2])

The Ste. Genevieve representatives of this species are like those which occur in the Salem limestone, in all essential particulars.

Girtyella indianensis (Girty) (Pl. XVI, Figs. 9, 10 [×2])

This is another species which was originally described from the Pella beds of Iowa, and examples from the two regions are alike in all essential characters. The species has sometimes been identified with *G. turgida* of the Salem limestone fauna, but it is more elongate than that species, more rounded in front and consequently less broadly truncated. The mesial sinus is commonly less profound than in *G. turgida*, and the shells are usually larger.

Sphenotus monroensis (Worthen) (Pl. XVII, Figs. 3, 4 [×2])

This species was originally described from this locality under the name *Pleurophorus monroensis*. From a study of the original types of the species, and a comparison of them with the type of *Solenomya monroensis*, also from this locality, it has been determined that the two are identical specifically. The species is one of the commoner pelecypods in the fauna.

Sphenotus octocostatus n.sp. (Pl. XVI, Figs. 21, 22 [×2])

This species is characterized by its elongate ovate outline, with a broad, shallow, oblique sinus passing from the beak to the basal margin. The surface of the shell, back of the sinus, is marked by about eight faint ribs, which radiate from the beak to the posterior and postero-basal margin, the spaces between the ribs being subequal and much broader than the ribs themselves. The dimensions of one of the larger specimens are: length 22 mm., height 8.7 mm., convexity 3.7 mm.

Edmondia fountainensis n.sp. (Pl. XVII, Fig. 1 [×2])

Shell sub-elliptical in outline, without umbonal ridge. The beaks rather small, incurved, but little elevated above the hinge-line, situated about one-fifth the length of the shell from the anterior extremity. Surface nearly smooth, marked only by concentric lines of growth which are somewhat more regular and stronger upon the short, anterior slope. The dimensions of a nearly perfect right valve are: length 20 mm., height 12 mm., convexity 4 mm.

Edmondia genevievensis n.sp. (Pl. XVI, Fig. 28 [×2])

This species differs from the last in being smaller, and proportionally much shorter. The surface markings consist of fine, regular, concentric lines of growth, which vary somewhat in strength, and even finer radiating costae, which are obscure or obsolete upon the posterior half of the shell. The dimensions of a nearly complete left valve are: length 13 mm., height 10 mm., convexity 3 mm.

Nucula illinoiensis Worthen (Pl. XVII, Figs. 5, 6 [×4])

This species is one of the commoner members of the fauna. It is allied to *N. shumardana* of the Salem limestone, but the beaks are not situated so far forward as in that species, and consequently the angle formed at the beak by the posterior and anterior slopes of the dorsal margin is greater. The dimensions of a medium-sized specimen with the two valves in articulation are: length 5.5 mm., height 4.5 mm., thickness 3 mm. The species reaches a maximum size of about 10 mm. in length, if some fragmentary specimens have been correctly identified.

Leda curta Meek and Worthen (Pl. XVII, Figs. 11, 12 [×4])

This species was originally described from the locality which has furnished the collection under discussion. The original illustration of the species is very unsatisfactory, but the description fits our specimens very well, and a comparison with the type specimen has shown the identification to be correct. The species occurs somewhat commonly in the fauna, and may be compared with *L. nasuta* Hall, from the Salem limestone. The Ste. Genevieve species, however, has much more convex valves than that one, and the concentric markings are stronger and more regular.

Yoldia levistriata Meek and Worthen (Pl. XVII, Fig. 2 [×3])

Several examples of this species have been secured which agree perfectly with Meek and Worthen's original definition and figures. The largest specimen observed has a length of 14.3 mm. and a height of 8.5 mm.

Parallelodon minima (Worthen) (Pl. XVII, Fig. 7 [×2])

This species has been identified with the little shell described by Worthen as *Pleurophorus minima*, the type specimens of which were collected from the locality on Fountain Creek from which the fauna here described was obtained. The original description of the species, so far as it goes, fits the specimens which have come under observation, but the original illustration is not a good representation. The present identification has been made on the basis of a comparison with Worthen's type specimen.

Parallelodon illinoiensis n.sp. (Pl. XVI, fig. 24 [×2])

This species is characterized by the very strong, sublamellose, concentric lines of growth, with the radiating costae nearly obsolete, these markings being best developed upon the posterior wing, where they are discontinuous, becoming obsolete toward the inner portion of each concentric band; upon the body of the shell the radiating markings are nearly obsolete, but they can be detected as faint impressions along the outer margins of the concentric bands. The hinge-line is considerably shorter than the shell length, the anterior margin is convex, the basal margin nearly straight, the postero-basal extremity rather abruptly rounded, and the posterior margin very oblique and gently convex. In its general outline and strong concentric markings this shell resembles members of the genus *Cypricardinia*, but its radiating markings differentiate it from that genus. The dimensions of a nearly complete specimen are: length 14.5 mm., height 6.5 mm.

Conocardium mesialis n.sp. (Pl. XVI, Fig. 20 [×4])

This species is characterized by the presence of a mesial region passing from the beak to the ventral margin in a slightly oblique direction, whose surface is differentiated from the shell surface both anteriorly and posteriorly. In the type specimen this mesial region is marked by six radiating costae, the most posterior one being the strongest rib upon the entire shell surface; the rib immediately in front of the coarse one is finer than any of the others, and does not extend to the beak; the other four are of nearly equal size and continue to the umbonal region, if not to the beak. The surface of this mesial region is gently convex in an antero-posterior direction, but both in front and behind the surface becomes concave. The anterior extension of the shell from the mesial region is subtriangular in outline, dorso-ventrally it is rather strongly convex, with the curvature more abrupt to the hinge-line;

in an anterior direction the surface is gently concave; the surface is marked by radiating costae finer than those upon the mesial region, which to some extent alternate in size, the smaller ones being intercalated between the larger ones below the umbonal region. The posterior slope of the valve is much more abrupt than the anterior, and is marked by radiating ribs which are successively intercalated in the intercostal space just posterior to the strong posterior rib of the mesial region, four or five in all being present upon the abrupt portion of the slope. At the hinge-line the posterior portion of the shell is produced into a somewhat elongate, subtubular extension. The entire surface is marked by concentric lines of growth which are strongest upon the anterior slope. The dimensions of the type specimen are: length along the hinge-line 10 mm., height 6 mm., convexity of one valve 3 mm.

Myalina monroensis Worthen (Pl. XVI, Fig. 18 [×2])

This species is one of the less common of the pelecypods in the fauna. The dimensions of one of the largest individuals are: length in the direction of the obliquity of the shell 17.5 mm., greatest width at right angles to the last dimension 10.5 mm., convexity of a single valve 3 mm.

Schizodus depressus Worthen (Pl. XVI, Figs. 25–27 [×2])

This is one of the most abundant species in the fauna and exhibits a considerable amount of variation. An examination of the types of both species has shown that the shell described by Worthen as *S. circulus* is only a variation of this common form.

Aviculopecten monroensis Worthen (Pl. XVI, Figs. 13–15 [×2])

This species is represented by many individuals in the collection. It is subequilateral in form, with the right valve much less convex than the left. The anterior auriculation is more abruptly depressed than the posterior one in the left valve, while in the right valve it is longer and is separated from the body of the shell by a deep, narrow, byssal notch. The markings of the left valve consist of angular, radiating costae which alternate in size, the smaller ones being intercalated between the larger; the radiating costae are present upon both auriculations. The surface is also marked by concentric lines of growth which cross both the body of the shell and the auriculations, becoming somewhat stronger anteriorly and upon the anterior auriculations. The markings of the right valve are finer and less strongly defined. The largest example observed has a length of nearly 25 mm., but the average size is about 15 mm. or less.

Aviculopecten talboti Worthen (Pl. XVI, Fig. 11 [×2])

This species is much less common than the last. It is subequilateral in form, and may be distinguished from the last by its nearly smooth surface, which is marked by exceedingly fine, radiating and concentric costae, which can scarcely be seen except with a magnifying lens. A very complete valve of average size has a height of 11 mm. and a width of 11.3 mm.

Palaeolima minor n.sp. (Pl. XVI, Fig. 12 [×3])

Shell obliquely subovate in outline, the hinge-line short with the beaks situated at about the middle. The anterior and posterior auriculations small, subequal in size. Surface marked by fine, angular, radiating costae, which are much narrower than the intercostal spaces; they are somewhat irregularly spaced, but occur roughly in pairs, the intervals between the costae being a little more or less than 0.5 mm. The dimensions of the holotype are: length in an oblique direction from the beak to the postero-basal margin 7.5 mm., greatest width in a direction at nearly right angles to the last 5.5 mm.

Modiola illinoiensis (Worthen) (Pl. XVI, Figs. 16 [×3], 17 [×2])

This is one of the most common species in the fauna. Some of the largest examples attain a length of over 25 mm., but the average size is from 15 mm. to 20 mm.

Modiola fountainensis n.sp. (Pl. XVI, Fig. 19 [×2])

This species differs from the last in being more oblique and consequently proportionally more elongate, the beaks are less prominent, and the conspicuous oblique sulcus, which in *M.*

illinoiensis passes from the beak to near the middle of the ventral margin, is obsolete in this species. The valves are strongly convex in a dorso-ventral direction, and the surface is nearly smooth, being marked only by very faint lines of growth. The dimensions of the type specimen, which is somewhat incomplete at the margin, are: length about 16 mm., width about 6 mm.

Cypricardella oblonga Hall (Pl. XVII, Figs. 8–10 [×4])

This species, originally described from the Salem limestone, is represented by a few individuals which seem to be identical with examples from Spergen Hill, Indiana. The largest specimen examined has a length of 7 mm.

Cypricardella laevis n.sp. (Pl. XVII, Figs. 13, 14 [×2])

This species differs from *C. oblonga* in being larger and proportionally more elongate, with the truncate posterior margin shorter. The postero-dorsal margin, instead of being sub-parallel with the basal margin, as in the last species, slopes downward posteriorly and usually exhibits a more or less conspicuous hump about halfway between the beak and the upper extremity of the posterior truncation of the shell. The surface of the shell is nearly smooth. The dimensions of one of the cotypes are: length 10 mm., height 6.8 mm., convexity of one valve 2.5 mm.

Cypricardinia indianensis Hall (Pl. XVI, Fig. 23 [×4])

A single example of this Salem limestone species has been detected in the collections at hand, and, except that it is a small, perhaps immature, individual, it seems to agree in every respect with specimens from Spergen Hill, Indiana. The length of the specimen is 5.5 mm., the usual size of mature examples from the Salem limestone being twice as great.

Bembexia waterlooensis n.sp. (Pl. XVIII, Figs. 38, 39 [×4])

Shell small, conical in form, the apical angle about 53 degrees, volutions four or five in the holotype. The slit-band narrow, situated at the angular periphery. Above the slit-band the surface of the volutions presents a long straight slope to the suture next above, below the slit-band the surface is abruptly inflected with a gently convex curvature. In the higher volutions the lower slope is nearly covered, leaving only a low shoulder above the suture. The surface of the shell is marked by fine, revolving ridges, about three continuous ones occupying the upper third of the surface of each volution immediately below the suture; between these and the slit-band the ridges are more or less discontinuous, being represented rather by series of fine nodes. Below the slit-band continuous revolving ridges are again present. The revolving ridges are crossed by much finer lines of growth, which sweep backward from the suture to the slit-band. The dimensions of the type specimen are: height 3 mm., diameter 3 mm.

Mourlonia minuta n.sp. (Pl. XVIII, Figs. 35, 36 [×4])

Shell small, umbilicate, low-conical in form with about four and one-half volutions in the holotype, the apical angle about 100 degrees. Slit-band obscure. The upper portion of each volution, adjacent to the suture, is flattened to form a narrow, horizontal, unornamented band; at the outer margin of this flattened band is an obtusely angular shoulder, beyond which the surface of the shell in the outer volution curves continuously to the umbilicus with a nearly regular convex curvature, being slightly flattened just below the revolving shoulder. The entire convex surface of the outer volution is ornamented with fine revolving ribs, eighteen or more being present upon the holotype, the furrows between the ribs being about equal in width to the ribs themselves. The inner volutions are largely covered by the outer ones, the gently convex slope between the revolving shoulder and the next outer suture being a little broader than the horizontal band between the revolving shoulder and the next suture above. The dimensions of the holotype are: height 3 mm., diameter 3.6 mm.

Ptychomphalus wortheni n.sp. (Pl. XVIII, Figs. 24–28, [?]31 [×4])

Shell small, imperforate, low-conical in form, with five or six volutions, apical angle about 85 degrees. Apertural slit deep, rather broad, situated at the middle of the outer volution; the suture well defined; surface of the outer volution sloping with a gently convex curvature from the suture to an obtuse, somewhat obscure, revolving shoulder a little above the slit-band; beyond this shoulder the surface is nearly vertical across the periphery, the slit-band occupying the middle of the vertical surface, the undersurface of the volution convex to the center. The entire surface marked by revolving ribs; the median, flattened, peripheral surface is bounded above and below by such a rib, with two others lying between and marking the limits of the slit-band; the upper slope, between the peripheral surface and the suture, bears two ribs, rarely only one, and is marked also by oblique, transverse, wrinkle-like ribs; the basal surface of the shell is marked by about eight revolving ribs. The outer volutions cover the inner ones to about the height of the slit-band. The dimensions of the holotype are: height 3.5 mm., diameter 4 mm. A larger specimen is 7 mm. high and 6.7 mm. in diameter.

Ptychomphalus sinuatus n.sp. (Pl. XVIII, Figs. 29, 33, 34 [×4])

Shell small, imperforate, low-conical in form, with about five volutions in the holotype, apical angle about 95 degrees. The slit-band obscure; the suture sharply defined; the surface of the outer volution flattened above adjacent to the suture, and sloping gently outward to an angular, revolving shoulder at the periphery of the shell; below this shoulder the surface is concave for a short distance, beyond which it is convex to the center of the under side. Surface of the shell marked by revolving ribs, a strong one situated upon the upper flattened surface near the suture, and another, fainter one, near the outer margin of the same flattened surface; just below the revolving shoulder is a strong rib which probably, with the rib forming the shoulder, bounds the slit-band; the concave surface marked by one or two faint ribs, and the lower convex surface marked by about twelve ribs. The outer volutions covering the inner ones to about the lower margin of the concave, revolving band. The dimensions of the holotype are: height 3 mm., diameter 3.1 mm.

This species may be easily distinguished from the last by the concave peripheral band, by the somewhat finer revolving ribs, by the less conspicuous or totally absent oblique wrinkle-like markings of the upper surface of the volutions, and by the more depressed spire.

Ptychomphalus depressus n.sp. (Pl. XVIII, Fig. 30 [×4])

Shell very small, depressed-conical, the apical angle about 105 degrees, about four or five volutions. Slit-band obscure. The suture well defined, the surface of the outer volutions convex from the suture to the columellar margin, with the curvature a little stronger over the periphery. Surface marked by revolving ribs, five strong ones being present between the suture and a line a little below the periphery; below these coarse ribs are other much finer, obscure ones, which occupy the surface to the columellar margin. The outer volutions cover the inner ones to a line a little above the periphery. The diameter of the type specimen is 2 mm.

This little species differs from *P. wortheni* in being more depressed, and in having much more regularly rounded volutions. It differs from *P. sinuatus* in its coarser revolving ribs upon the upper and peripheral surface of the volutions, and in lacking the revolving shoulder with revolving sinus beneath it.

Ptychomphalus? fountainensis n.sp. (Pl. XVIII, Figs. 12–14, [×4])

Shell small, higher than wide, the apical angle about 40 degrees. Volutions five or six, the suture strongly impressed, the surface of the volutions regularly convex. The slit-band even with the general surface, situated a little above the middle of the volution, the distance between its upper margin and the suture about equal to the width of the slit-band itself; surface of the volution above the slit-band smooth, that below marked by fine, revolving ribs, nine or ten being present in the holotype. The dimensions of the holotype are: height 4 mm., greatest diameter 2.3 mm.

The specimen illustrated in Fig. 14 has been selected as the holotype of this species. Some specimens which have been included have a slightly lower spire, and consequently a little broader apical angle. Such a specimen has been illustrated in Fig. 12, and further study may show that these forms should be considered as a distinct species.

Cyclonema globosa n.sp. (Pl. XVIII, Fig. 37 [×4])

Shell very small, subglobose in form, volutions about four in number, the apical angle about 75 degrees. The suture well defined, the surface of the volutions regularly convex, marked by revolving ribs which are subequal in strength and are placed nearly equidistantly. No slit-band discernible. The outer volution covers the next inner one for about two-thirds its entire height. The dimensions of the holotype are: height 2 mm., diameter 2 mm.

Solenospira pygmaea n.sp. (Pl. XVIII, Figs. 1–5, 6[?] [×4])

Shell very small, high-spired, with nine or more volutions, the apical angle about 20 degrees. The suture deeply impressed, each volution only slightly covering the preceding one. The surface of the volutions regularly convex, marked by regular revolving ribs, four or five being present upon the exposed portion of each volution. Aperture entire, subcircular in outline. The dimensions of a specimen of average size are: height 3.7 mm., diameter 1.3 mm.

Associated with the specimens of this species are some examples with slightly lower volutions, and with only two conspicuous revolving ribs upon the exposed surface of each volution, although a third one is present close down toward the lower suture. Such a specimen is illustrated in Fig. 6. It is possible that these shells should be considered as a distinct species.

This little shell resembles *S. turritella* from the Salem limestone, but the volutions are distinctly less oblique than in that species.

Solenospira illinoiensis n.sp. (Pl. XVIII, Figs. 21–23 [×4])

Shell very small, high-spired, with six or seven volutions, the apical angle about 40 degrees. The suture strongly impressed, each volution covering about the lower third of the one preceding. The surface of the volutions strongly convex from suture to suture, and marked by regular revolving costae. A pair of larger costae more nearly approximate than the remaining ones are present midway between the sutures; two other costae subequal in size, but slightly smaller than and subequally distant from the peripheral pair, are also present, one near each of the bounding sutures of the volutions above the last, making four well-defined costae upon each of the higher volutions. Upon the exposed anterior surface of the last volution several additional costae are present, which are entirely covered in the higher volutions. The surface of the shell is also marked by fine, transverse lines of growth. Aperture entire, subovate in outline. The dimensions of an average specimen are: height 4.1 mm., diameter 2 mm.

This species differs from the last one in having a somewhat greater apical angle, and is consequently proportionally shorter and less slender. The revolving costae are also less equally spaced.

Eotrochus sp. (Pl. XVIII, Figs. 40, 41 [×2])

A number of fragments of a pyramidal gastropod shell have been referred to this genus. They probably represent an undescribed species, but the specimens available are too incomplete for definition. When complete the largest example must have had a diameter of about 15 mm. and a height of about 10 mm. The members of this genus resemble *Euconospira*, the chief differential character being the presence of a perforate umbilicus in *Eotrochus*.

Bellerophon sublaevis Hall (Pl. XIX, Figs. 11, 12 [×2])

Several examples of this species are present in the fauna which seem to agree in all respects with shells from the Salem limestone.

Bellerophon monroensis n.sp. (Pl. XIX, Figs. 7, 8 [×2])

Shell rather small, umbilicate, expanding regularly but not abruptly, the aperture broader than long, its margin not flaring, the apertural notch of moderate depth and width. The dorsum marked by a broad, convex, peripheral band which is obscure toward the apex of the shell, becoming progressively more elevated toward the apertural margin, where it becomes a conspicuous feature somewhat wider than the apertural notch. Surface of the shell, in the holotype, nearly smooth throughout, except for some obscure lines of growth toward the aperture, but on the smaller portion of the shell just beyond the apertural callosity a small area is exposed which is distinctly marked by very fine, sharply raised, transverse and longitudinal costae, the longitudinal being somewhat broader than the transverse ones. The presence of these markings, which are entirely like those of the genus *Bucanopsis*, indicate that in the immature stages of growth, at least, this shell was not smooth, and it is possible that the present smooth surface of the holotype may be due to abrasion.

This species may be easily distinguished from the associated *Bellerophon sublaevis* by reason of its less globular form and by its broad, convex, and strongly elevated peripheral band toward the front. If the suggested surface markings are really a feature of the adult shell, they too will serve effectually to distinguish the two species.

Euphemus lentiformi n.sp. (Pl. XIX, Figs. 9, 10 [×4])

Shell small, sublenticular in form, imperforate, the outer volutions completely covering the inner ones, peripheral band rather narrow, flattened in the outer half of the shell and sharply defined laterally, becoming a little convex about one-half volution back from the aperture and less sharply defined laterally, the sides of the shell gently convex from the margins of the peripheral band to the center. Aperture about as wide as high, the margin imperfect in the specimen examined, but apparently with a rather deep peripheral notch. Surface marked by fine, raised, revolving costae, which become obsolete toward the aperture; from seven to ten occupy each side of the outer volution, situated at regular intervals; in some specimens they become nearly or quite obsolete beyond the middle of each side of the volution; two costae are usually present upon the peripheral band. The dimensions of a nearly complete specimen are: greatest diameter 5.5 mm., thickness 3 mm.

This little shell possesses the revolving costae, obsolete toward the aperture, which characterize members of the genus *Euphemus*, but it differs from other members of the genus in its less globular and more lenticular form.

Straparollus similis Meek and Worthen (Pl. XVII, Figs. 17–19 [×4])

This little shell was originally described by Meek and Worthen from specimens collected at the locality from which the fauna under consideration was secured. The species is a rather common member of the fauna, and suggests *S. spergenensis* from the Salem limestone, but the volutions are flattened above with a distinctly angular shoulder where the surface passes into the peripheral portion.

Straparollus similis var. *planus* Meek and Worthen (Pl. XVII, Figs. 15, 16 [×4])

This varietal form should perhaps not be considered separately from *S. similis*. It was originally described by Meek and Worthen from the same locality as the last, and differs from it only in the somewhat more depressed spire.

Naticopsis wortheni n.sp. (Pl. XIX, Figs. 1, 2 [×4])

Shell small, imperforate, with about two and one-half volutions which increase rapidly in size, the spire only a little elevated above the outermost volution, the suture rather strongly impressed. The surface of the outer volution regularly curved, the slope from the periphery to the suture being more abrupt than the anterior slope. The aperture subovate in outline, higher than wide. Surface nearly smooth or marked only by obscure lines of growth. The dimensions of the largest and most complete specimen examined are: greatest diameter 6 mm., height 5.9 mm., height of aperture about 5.3 mm., width of aperture 4.1 mm.

In some respects this species resembles *N. carleyana* from the Salem limestone, but the spire is more depressed, and the specimens as preserved lack the stronger longitudinal markings on the upper portion of the volutions just outside the suture, which are so commonly present in *Naticopsis*, and which are well exhibited in good specimens of the Salem limestone species.

Naticopsis waterlooensis n.sp. (Pl. XIX, Figs. 3–6 [×4])

Shell small, imperforate, with two or three volutions which increase rapidly in size, the apical angle about 95 degrees. The spire low, but distinctly elevated above the outer volution, suture not impressed. Surface of the outer volution sloping away from the suture in a nearly straight or slightly concave line for a short distance, then becoming regularly convex across the periphery to the anterior margin. The aperture subovate in outline, higher than wide. Surface of the shell, as preserved, nearly or quite smooth, or marked only by inconspicuous lines of growth. The dimensions of one of the largest specimens observed are: greatest diameter 4.3 mm., height about 5 mm.

The members of this species differ from those of the species last described in their more elevated spire and in the absence of the impressed suture.

Holopea fountainensis n.sp. (Pl. XVIII, Figs. 10, 11 [×4])

Shell minute, imperforate, the height of the spire about equaling the height of the aperture, the apical angle about 50 degrees. Volutions four or five in number, the suture moderately impressed; the surface of the volutions regularly convex, smooth or marked only by obscure lines of growth. The dimensions of a large individual are: length 3 mm., maximum diameter of last volution 2 mm.

Bulimorpha pygmaea n.sp. (Pl. XVIII, Figs. 7, 8 [×4])

Shell minute, fusiform, imperforate, with about five volutions, the height of the spire about equaling the height of the outermost volution. The suture a little impressed, the surface of the volutions with a slight, inconspicuous shoulder just below the suture, beyond which it is gently convex to the next suture. The aperture narrowly subovate in outline, a little pointed both anteriorly and posteriorly. The dimensions of a large individual are: length 3.3 mm., greatest diameter 1.4 mm.

This little shell resembles *B. canaliculata* from the Salem limestone, but it has a somewhat higher spire and the volutions are less conspicuously shouldered than in that species. It also resembles *B. bulimiformis*, also from the Salem limestone, but the Ste. Genevieve shell is shorter, with the slightly shouldered volutions. The species is, in fact, somewhat intermediate in character between these two Salem limestone species.

Bulimorpha whitfieldi n.sp. (Pl. XVIII, Figs. 15–17 [×4])

Shell small, fusiform, imperforate, with five or six volutions, the height of the spire greater than the aperture, the apical angle about 40 degrees. The sloping sides of the spire nearly straight, only slightly interrupted by the impression of the suture; the surface of the volutions very slightly convex between the sutures, smooth or marked only by obscure lines of growth. Aperture higher than wide, pointed posteriorly, somewhat rounded anteriorly. The dimensions of a large example are: length about 8 mm., greatest diameter 4 mm.

The generic relations of this little shell are quite uncertain, and it should perhaps be referred to *Meekospira* instead of *Bulimorpha*. It somewhat resembles the Salem limestone shell which is known by the name *Holopea proutana*, but it has a proportionately higher spire, less deeply impressed suture, and more elongate aperture.

Loxonema wortheni n.sp. (Pl. XVIII, Figs. 18–20 [×4])

This is a small, imperforate, high-spired shell, with eight or more volutions when complete. The apical angle about 32 degrees, the suture moderately impressed, the surface of the volutions moderately convex between the sutures. The aperture subovate in outline, rounded anteriorly and pointed posteriorly. The surface ornamented by fine, rounded, nearly vertical corrugations, between thirty and forty being present upon each volution. The dimensions of a large specimen are: length about 8 mm., greatest diameter 3.3 mm.

This species resembles *L. yandellana* from the Salem limestone, but it differs from that species in its shallower suture, and consequently in the less convexity of the volutions from suture to suture.

Meekospira minuta n.sp. (Pl. XVIII, Fig. 9 [×4])

Shell small, imperforate, with a high, acutely pointed spire; volutions eight or more in number, the suture very slightly impressed, and the surface of the volutions consequently very gently convex, the sides of the shell from the apex to the zone of greatest diameter being nearly straight. The aperture subovate, rounded anteriorly and pointed posteriorly. The dimensions of a nearly perfect specimen are: length 7 mm., greatest diameter 2 mm.

The genus *Meekospira* has not previously been identified from rocks of Mississippian age, although it is not improbable that some species have been described as members of other genera which properly belong here. The present species resembles several of the Pennsylvanian species more or less closely, but differs from all of them in its minute size.

Platyceras sp. A (Pl. XIX, Figs. 17, 18 [×4])

A number of small, more or less incomplete, examples of *Platyceras* have been observed in this Ste. Genevieve fauna, and two specimens, perhaps representing two distinct species, are illustrated herewith. The first of these is a very small, rapidly expanding individual, with a minute, closely coiled apex, the shell being somewhat compressed laterally.

Platyceras sp. B (Pl. XIX, Fig. 19 [×2])

The second specimen of *Platyceras* here illustrated is much larger than the last, it is more erect, and expands much less rapidly. It is incomplete at the apex, but apparently did not possess the small, closely coiled, apical portion.

Laevidentalium venustum Meek and Worthen (Pl. XIX, Fig. 13 [×2])

The locality which has furnished the material here described is the type locality for this species, which was originally defined as a member of the genus *Dentalium*. It occurs in abundance in a more or less fragmentary condition. The *Dentalium*-like shells from the Salem limestone which have been referred to this species are certainly identical in all essential characters.

Orthoceras epigrus Hall (Pl. XIX, Figs. 14, 15 [×4])

Only two fragmentary specimens of this shell have been observed. The best one consists of two chambers only, with a portion of the shell substance preserved. The length of the chambers, the concavity of the septa, and the angle of divergence of the sides of the shell seem to agree closely with the illustrations of the species described as *O. epigrus* from the Salem limestone. The surface of the shell is apparently marked by exceedingly faint longitudinal and annular lines, which are not shown in the illustration of the type of the species from Spergen Hill, although Hall mentions the presence of rather faint, longitudinal lines in his original definition.

Stroboceras sp. (Pl. XIX, Fig. 16 [×2])

A single fragment of a laterally flattened, disk-like nautiloid shell, with the sides distinctly ribbed, has been observed in this fauna. It is apparently congeneric with *S. sulcatum* (Sow.), as described and illustrated by Foord,[1] which is one of the species referred to the genus by Hyatt, its founder.

Spirorbis sp. (Pl. XIX, Fig. 20 [×4])

A group of small, coiled, Annelid tubes, members of the genus *Spirorbis*, have been observed attached to a fragment of a pelecypod shell. They are clearly distinct from any of the forms which have been described from the Salem limestone, and may represent an undescribed species.

Phillipsia sp. (Pl. XIX, Fig. 24 [×2])

A single good example of the pygidium of a trilobite has been observed in the fauna. It probably belongs to the genus *Phillipsia*, but it has not been specifically identified.

Leperditia carbonaria Hall (Pl. XIX, Fig. 23 [×4])

A single very perfect shell of a *Leperditia* has been observed which seems to agree in all essential characters with *L. carbonaria* from the Salem limestone.

EXPLANATION OF PLATES

PLATE XVI

FIG. 1.—*Orthotetes kaskaskiensis* (McChesney)?
FIG. 2.—*Streptorhynchus;* cf. *S. minutum* (Cumings) (×4).
FIGS. 3–6.—*Composita trinuclea* (Hall) (×2).
FIGS. 7, 8.—*Pugnoides ottumwa* (White) (×2).
FIGS. 9, 10.—*Girtyella indianensis* (Girty) (×2).
FIG. 11.—*Aviculopecten talboti* (Worthen) (×2).

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[1] *Monog. Carb. Ceph. Ireland,* Part 3, p. 60, Pl. 20, Figs. 10–12.

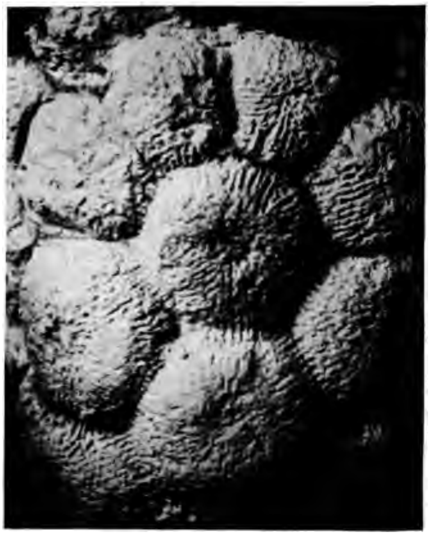
Fig. 12.—*Palaeolima minor* n.sp. (×3).
Figs. 13–15.—*Aviculopecten monroensis* (Worthen) (×2).
Figs. 16, 17.—*Modiola illinoiensis* Worthen (Fig. 16 [×3], Fig. 17 [×2]).
Fig. 18.—*Myalina monroensis* Worthen ×2).
Fig. 19.—*Modiola fountainensis* n.sp. (×2).
Fig. 20.—*Conocardium mesialis* n.sp. (×4).
Figs. 21, 22.—*Sphenotus octocostatus* n.sp. (×2).
Fig. 23.—*Cypricardinia indianensis* Hall (×4).
Fig. 24.—*Parallelodon illinoiensis* n.sp. (×2).
Figs. 25–27.—*Schizodus depressus* Worthen (×2).
Fig. 28.—*Edmondia genevievensis* n.sp. (×2).

PLATE XVII

Fig. 1.—*Edmondia fountainensis* n.sp. (×2).
Fig. 2.—*Yoldia levistriata* Meek and Worthen (×3).
Figs. 3, 4.—*Sphenotus monroensis* (Worthen) (×2).
Figs. 5, 6.—*Nucula illinoiensis* Worthen (×4).
Fig. 7.—*Parallelodon minima* (Worthen) (×2).
Figs. 8–10.—*Cypricardella oblonga* Hall (×4)
Figs. 11, 12. *Leda curta* Meek and Worthen (×4).
Figs. 13, 14.—*Cypricardella laevis* n.sp. (×2).
Figs. 15, 16.—*Straparollus similis* var. *planus* Meek and Worthen (×4).
Figs. 17–19.—*Straparollus similis* Meek and Worthen (×4).

PLATE XVIII

Figs. 1–6.—*Solenospira pygmaea* n.sp. (×4).
Figs. 7, 8.—*Bulimorpha pygmaea* n.sp. (×4).
Fig. 9.—*Meekospira minuta* n.sp. (×4).
Figs. 10, 11.—*Holopea fountainensis* n.sp. (×4).
Figs. 12–14.—*Ptychomphalus ? fountainensis* n.sp. (×4).
Figs. 15–17.—*Bulimorpha whitfieldi* n.sp. (×4).
Figs. 18–20.—*Loxonema wortheni* n.sp. (×4).
Figs. 21–23.—*Solenospira illinoiensis* n.sp. (×4).
Figs. 24–28.—*Ptychomphalus wortheni* n.sp. (×4).
Fig. 29.—*Ptychomphalus sinuatus* n.sp. (×4).
Fig. 30.—*Ptychomphalus depressus* n.sp. (×4).
Fig. 3 .—*Ptychomphalus wortheni* n.sp.? (×4).
Fig. 32.—*Cyclonema* sp. ×4).
Figs. 33, 34.—*Ptychomphalus sinuatus* n.sp. (×4).
Figs. 35, 36 *Mourlonia minuta* n.sp. (×4).
Fig. 37.—*Cyclonema globosa* n.sp. (×4).
Figs. 38, 39.—*Bembexia waterlooensis* n.sp. (×4).
Figs. 40, 41.—*Eotrochus* sp. (×2).



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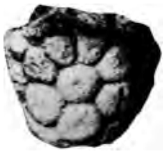

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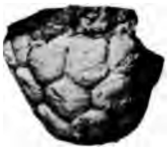

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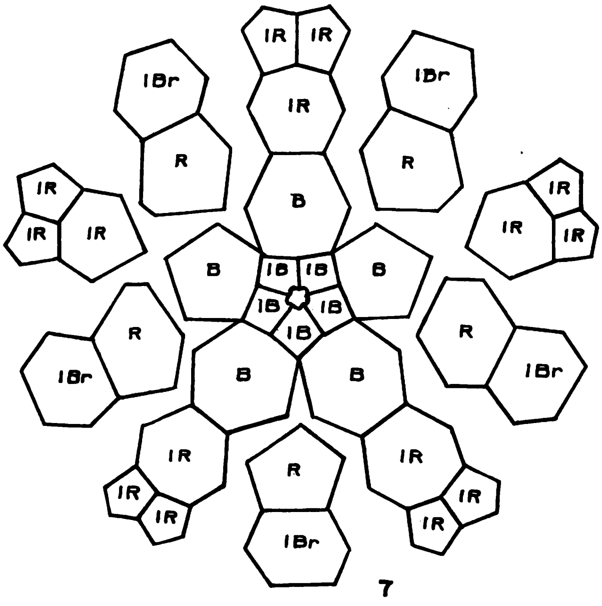

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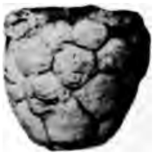

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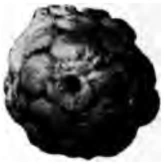

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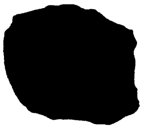
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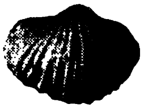
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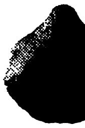
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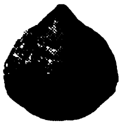
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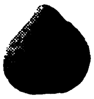
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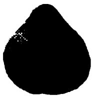
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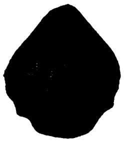
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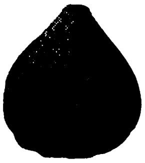
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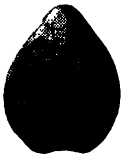
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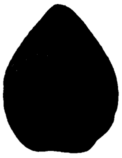
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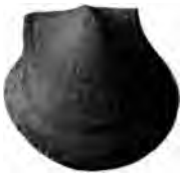
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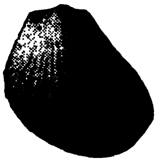
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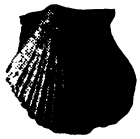
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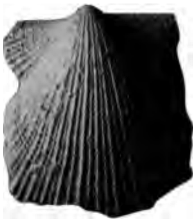
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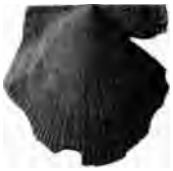
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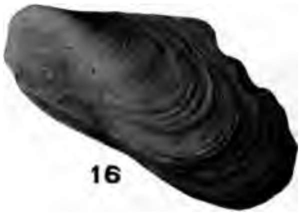
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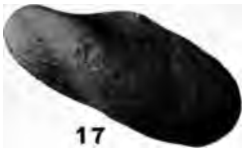
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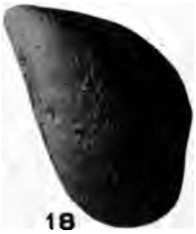
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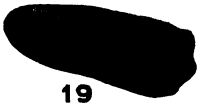
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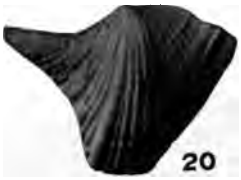
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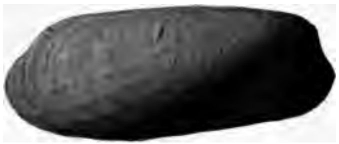
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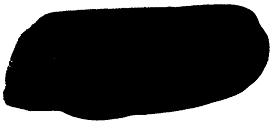
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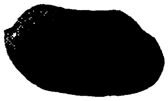
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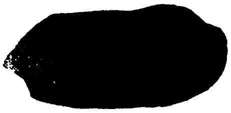
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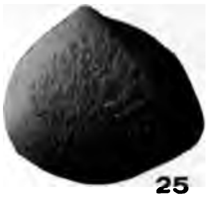
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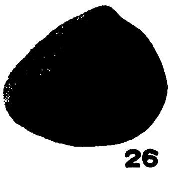
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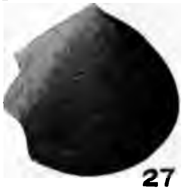
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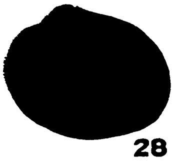
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